PROVINCE OF NEWFOUNDLAND, CANADA

ANNUAL REPORT

DEPARTMENT OF ENVIRONMENT
for the
Fiscal Year ended March 31, 1987

Published by the
Authority of the House of Assembly
St. John's, Newfoundland

90-03351/

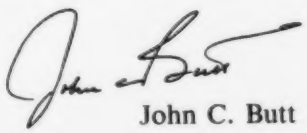
Minister of Environment
Province of Newfoundland

To His Honour James McGrath
Lieutenant-Governor of the Province of Newfoundland

May it Please your Honour:

It is my privilege to submit the Annual Report of the Department of Environment, Province of Newfoundland, for the fiscal year ended March 31, 1987.

Respectfully submitted,



John C. Butt

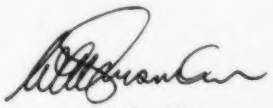
Deputy Minister of Environment
Province of Newfoundland

Honourable John C. Butt
Minister of Environment

Sir:

I have the honour to present to you the Annual Report of the Department of Environment, Province of Newfoundland, for the fiscal year ended March 31, 1987.

Respectfully submitted,



W. A. Kinsman

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Forward

This Annual Report covers the 1986-87 fiscal year and is the first such report issued since the creation of the Department of Environment in 1980.

The mandate of the Department as derived from the *Department of Environment Act* is a sweeping one, encompassing . . . "supervision, control and direction of all matters . . . relating to the protection and enhancement of the natural environment, including. . . water, air and soil quality". The Environmental Assessment Act extends this mandate by providing for the assessment of undertakings that may affect the socio-economic environment, thereby impacting upon the quality of life in the Province.

Further to the above and additional to its environmental protection role — the Department has overall management responsibility ". . . for the conservation, development, control, improvement and proper utilization of the water resources of the Province".

The total complement of legislation currently administered by the Department comprises the following:

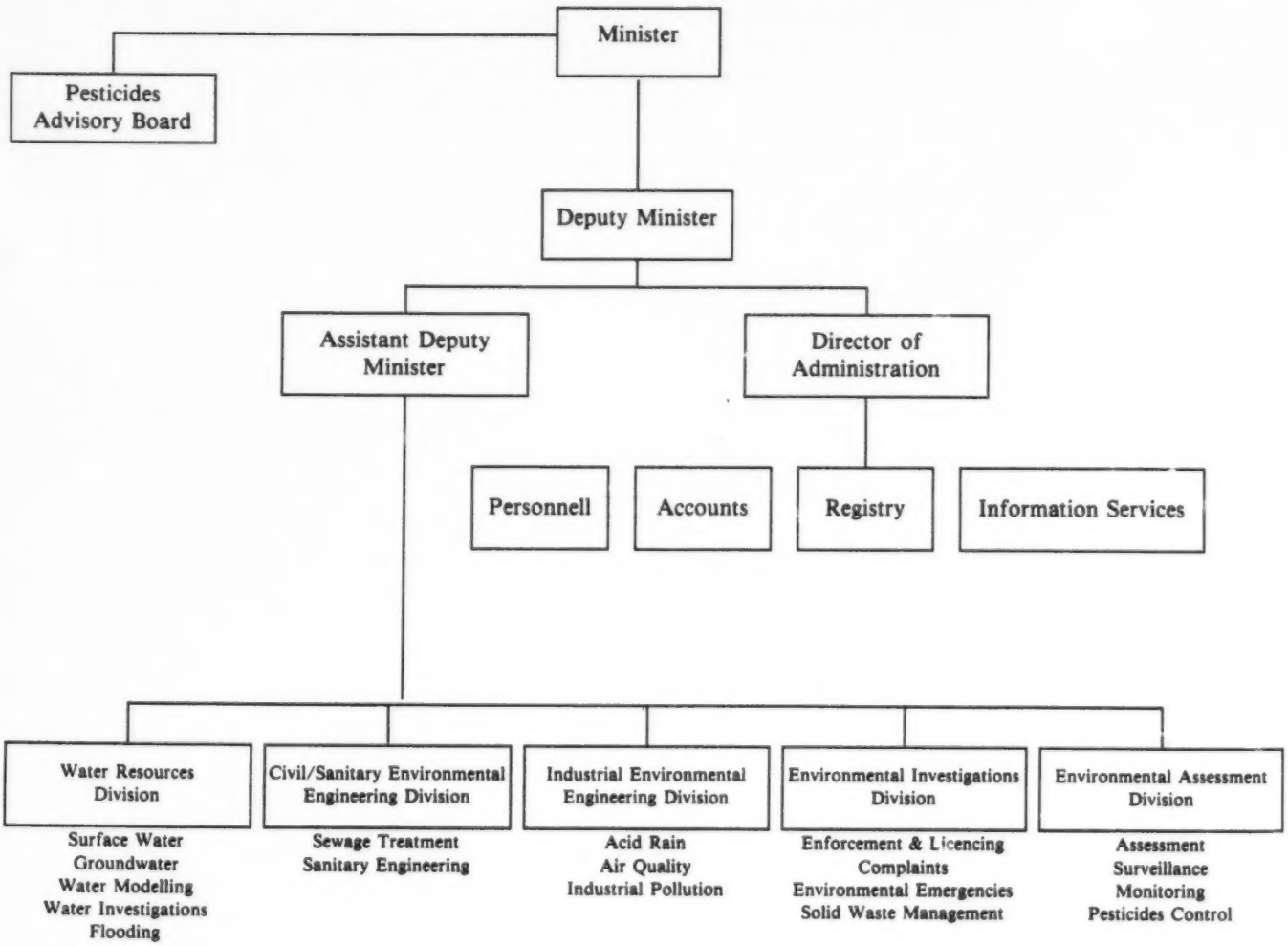
1. Department of Environment Act
2. Waste Material (Disposal) Act
3. Pesticides Control Act
4. Environmental Assessment Act
5. Well Drilling Act
6. Waters Protection Act
7. Environmental Control (Water & Sewage) Regulations
8. Air Pollution Control Regulations
9. Environmental Assessment Regulations
10. Pesticides Control Regulations
11. Storage and Handling of Gasoline and Associated Products Regulations
12. Prevention of Misfuelling of Light Duty Vehicles Regulations

Administration of this legislation and consequent fulfillment of the Department's mandate is accomplished through the operation of its six Divisions vis —

Administration
Environmental Investigations
Civil/Sanitary Environmental Engineering
Industrial Environmental Engineering
Water Resources Management
Environmental Assessment

ORGANIZATION CHART

DEPARTMENT OF ENVIRONMENT



REGIONAL OFFICES

Eastern — St. John's.....576-5724
Central - Grand Falls 292-4347
Western - Corner Brook.....637-2446
Labrador - Goose Bay 896-5709
(Summer only)

Administration Division

F. Harris — Director

1.0 INTRODUCTION

Under the direction of the Director of Administration, this division is responsible for the co-ordination and implementation of Government administrative policy and direction as it relates to the Department of Environment. This included the general control, management and regulation of all financial, administrative and personnel aspects of the various divisions of the Department including the provision of administrative support services to all divisions and senior executives.

Acknowledging staff shortages and transfers, the division was able to provide the required services for the Department. One of the highlights of the 1986-1987 year was the planning, co-ordination and final completion of the department's relocation from Elizabeth Towers to the new Confederation Building Complex in the summer of 1986. As a direct result of this move, preliminary planning started in December for the installing of modular furniture and the reorganization of the work areas for the summer of 1987.

Administration staff preparing budget.

2.0 The various activities of the administration division were completed by the Accounts, Personnel, Registry and Information Sections which are highlighted —

2.1 **Accounts:** Under the direction of the Chief Accountant, this Section was responsible for the planning, overseeing and direction of the accounting and financial services of the Department which included the processing of accounts payable, accounts receivable, Federal-Provincial claims and the preparation and distribution of all financial statements and reports. One Clerk III Voucher Clerk worked in this section with the Accountant. (see appendix).

2.2 **Personnel:** Under the direction of the Director of Administration this Section was responsible for the processing of all payroll documents, overtime payments, stand-by payments, leave records, cheque distribution, unemployment insurance records and other related personnel reports. This work was performed by the Clerk-Steno III (Staff Clerk). (see appendix).

2.3 **Registry:** Under the direction of the Department Registrar the registry section was responsible for the control and maintenance of the Department's personnel files, administration files and subject files of the various divisions. The Registrar also was responsible for the receiving, sorting and distribution of all incoming Department mail.

2.4 **Library:** The Department has a Technical Library which contains approximately 2000 publications dealing with environmental issues. At the present time the collection is uncatalogued and is mainly used by department staff only.

2.5 **Information:** Under the direction of the Information Specialist, this section was responsible for the development and distribution of environmental information and educational materials. There were over 200 written requests received and responded to as well as over 1000 personal or telephone requests for information.

There are now 19 general interest publications available free of charge from the Department, that cover a wide range of environmental topics, as well as two film-strip/cassette programs suitable for use in the elementary or junior high grades.

Information was also provided to the public through press releases on important issues.

Publications presently available from the Department:

(1) Our Coastal Environment
(32 page booklet suitable for use in junior and senior high school)

(2) Hazardous Waste in the Province of Newfoundland
(4 page fact sheet suitable for use in junior and senior high school)

(3) Dioxins and Furans — The Canadian Perspective,
(pamphlet — suitable for senior high school)

(4) The PCB Story
(32 page booklet suitable for use in junior and senior high school)

(5) Controlling PCBs
3 pamphlets — The Nature of the Problem
— Management of PCBs in Canada
— The Options Available
(suitable for use in junior and senior high school)

(6) Leaking Underground Storage Tanks
(4 page Fact Sheet — junior and senior high school)

(7) Acid Rain — A Newfoundland and Labrador Perspective
(12 page booklet — suitable for use in junior and senior high school)

(8) Safe Wood Burning — A Guide to Reducing Air Pollution and Fire Hazards
(pamphlet — general public)

(9) Environmental Assessment — A Guide to the Process
(34 page booklet suitable for senior high school and for companies, individuals, etc. who are planning to register a project with the Department)

(10) Environmental Assessment — Planning for Tomorrow
(pamphlet suitable for senior high school, general public)

(11) Pesticide Vendor Licencing

(12) Licencing of Pesticide Operators and Applicators
(pamphlets on Department's pesticide licencing procedures)

(13) Canada/Newfoundland Flood Damage Reduction Program (Brochure on program)
Flood information Maps available for the communities of Stephenville, Steady Brook, Badger, Placentia, Rushy Pond, Rushoon.

(14) Before you alter a body of water (pamphlet — general public, contractors, construction companies)

(15) Before you drill your water well (pamphlet — general public)

(16) After you drill your water well (pamphlet — general public)

(17) Nature's Way — How Wastewater Works For You (pamphlet — general public)

(18) Hazardous Waste Inventory Report Newfoundland and Labrador 1983.

(19) Newfoundland Abandoned Waste Disposal Sites Study, Phase I-Final Report.

3.0 ADMINISTRATION STATISTICS

3.1 Accounts

Invoices Processed	3,300
Imprests Processed	55
Vouchers Processed	1,700
Cash Receipts Processed	130
Travel Claims Processed	470
Gross Budget	$8,962,200
Revenue	$5,353,400
Net Budget	$3,608,800

3.2 Personnel

Payroll changes processed	372
Overtime/Standby Payments processed	150
Permanent positions on staff	63
Resignations/transfers permanent staff	7
Appointments to permanent positions	16
Temporary employees hired	26
Students hired	11
Reclassifications processed	12

Civil/Sanitary Environmental Engineering Division

K. Dominie — Director

1.0 INTRODUCTION

The Civil/Sanitary Environmental Engineering Division is primarily responsible for the investigation and identification of environmental problems relating to the design, construction and operation of municipal infrastructure systems. A large part of this activity is the assessment and recommendation for approval of capital works projects in accordance with Sections 21 and 23 of the Department of Environment Act. This assessment of projects involves all activities from initial contact by proponents, assessment of design details, and follow up during construction.

The investigation of reported problems is carried out by conducting sanitary surveys and undertaking water quality monitoring programs. Divisional reports on such surveys generally form the basis for more detailed investigations and proposals of alternate solutions to the problems.

There are 312 incorporated municipalities in the Province, and over the past several years the Division, through its regional staff, has established a presence and working relationship with most of these. In addition to these incorporated areas, many smaller unincorporated areas are also serviced by the Department.

The Division is also responsible for the design and delivery of training programs to municipal operators, an activity which is just getting underway and offers a new challenge to staff during the next several years.

The Division also provides technical advice to other Divisions of the Department on such matters as septic tank applications, solid waste facility construction and operation, and heavy civil engineering works.

Plum Point Lift Station seminar demonstrating pump controls.

The Division is currently staffed by six full time personnel, supplemented by student assistance whenever possible. Staff are based in three regional offices — Western and Labrador (Corner Brook), Central (Grand Falls) and Eastern (St. John's). Headquarters for the Division is located in the West Block of the Confederation Building in St. John's.

The six full time personnel are as follows:

1 Director
1 Training Coordinator (Engineer III)
3 Engineering Technician III's
1 Clerk-Stenographer

A new Engineering Technician II position was approved for the Western office in 1986 but this is still in the recruitment stage.

The activities of the Division for 1986 are outlined in the following report.

2.0 PROJECT ASSESSMENT AND INSPECTION

During 1986, 125 projects were recommended for approval by the Minister. While the majority of these projects were sponsored by the Province through the Department of Municipal Affairs, a number were funded through Federal assistance programs. The projects were assessed in the field before approval was recommended with follow up inspection during construction to ensure the terms and conditions of the approval were followed. Several major projects were:

1. Grand Falls Water Study
2. Port aux Basques Water Treatment Plant
3. Gander — Sewage Treatment Plant Modification

3.0 SEWAGE TREATMENT PLANT MONITORING AND INSPECTION

In 1986 there were 86 sewage treatment plants in operation in the Province. These serviced several types of facilities and systems as follows:

Municipal	- 37
Schools	- 20
Service Stations	- 4
Institutions	- 8
Office Buildings	- 8
Trailer Court	- 3
Camping Parks	- 1
Commercial	- 5

It is the Division's policy to inspect each plant at least 3 times each year and to sample the influent and effluent on at least one of these visits. While the lack of manpower has prohibited this schedule from being met, the Division is aware of the operating conditions of all plants. These inspections and testing procedures have outlined problems both with the design and operation of many of the plants. A major survey was done on all plants in the Province during 1985 and a report finalized in 1986. This report has been released and is a good reference document for those involved in the design, modification and operation of existing and new plants in the Province.

4.0 SURFACE WATER SAMPLING

Surface water sampling programs were concentrated in the Central area of the Province in 1986. Programs were undertaken on the following watercourses.

1. Exploits River
2. Gander River
3. Peter's River

The Exploits River Sampling Program was a continuation and extension of a program undertaken in 1984. The 1984 program identified the impact of the discharge of municipal sewage into the River from the Towns of Grand Falls, Bishop's Falls and Windsor. The 1986 program was the first step in further defining the level and scope of this impact. It is proposed to continue this program into 1987.

The Gander River program was undertaken to determine if discharges from the sewage treatment plants in Glenwood and Appleton were having an impact on the River water quality. The results of the program are preliminary to date and a continuation of this program is planned for 1987 and beyond.

The Peter's River Program was undertaken because of concern expressed locally over the water quality, because the River is the source of drinking water for the Town of Botwood. No outstanding water problems were identified and the Division has no plans to continue this program in 1987.

5.0 OPERATOR TRAINING

1986 saw a great improvement in the delivery of training programs to municipal operators. This came about as a result of hiring a full time training coordinator. The coordinator is currently assessing specific needs for operator training and will be developing material in accordance with these needs. The program is now being planned and operated on a systematic basis whereby potential course participants will be notified well in advance of planned sessions so that they will be able to make more efficient use of their time available for development of their skills.

During the year 21 training sessions were held at which 236 persons were in attendance. Some of the topics covered during these sessions were:

1. Chlorination of Potable Water Supplies
2. Cross-Connection Control
3. Rotating Biological Contractor method of Sewage Treatment
4. Wastewater Pump Station Operation and Maintenance

The program will be expanded in the future to include further topics which will give operators a broader knowledge of their systems and enable them to operate and maintain their systems more economically and efficiently.

Future plans include contacting smaller communities to offer training programs to any interested group or individual, if there is a demonstrated need.

The Division is currently represented on the Atlantic Canada Voluntary Certification Board. This board has just established a voluntary certification program and the criteria for certification are consistent with those in place in other Canadian Provinces. Operators in this Province will be made aware of this program and their participation in it will be encouraged.

6.0 STAFF DEVELOPMENT AND TRAINING

The Division continued to support technical staff in their efforts to upgrade their technical skills so that the Division could address new problems related to its mandate. In 1986 training efforts by staff were concentrated in (1) water treatment and (2) cold weather engineering. These two subject areas will be of importance in the near future as the Province continues its capital works program.

Environmental Assessment Division

M. Rigby — Director

1.0 INTRODUCTION

The Environmental Assessment Division is comprised of three branches, the Environmental Assessment Branch, the Environmental Impact Management Branch, and the Pesticides Control Branch. The Division successfully completed a year of transition which saw a number of environmental assessments completed, program areas consolidated and new personnel added to the Division.

At the end of the fiscal year, the Division was staffed by 1 Director, 3 Branch Managers, 1 Environmental Biologist, 2 Surveillance Officers, 1 Environmental Technician and 1 Support Staff.

The Division is responsible for the administration of the Environmental Assessment Act and the Pesticides Control Act. The purpose of the Environmental Assessment Act is to protect the environment and the quality of life of the people of the Province of Newfoundland and to facilitate the wise management of the Province's resources. The Pesticides Control Act governs the use of pesticides in the Province.

2.0 ENVIRONMENTAL ASSESSMENT BRANCH

During 1986, the Branch processed a number of referrals leading to 35 new registrations, 28 of these were released and three required the preparation of an Environmental Impact Statement. One registration is still under review.

Four exemptions were issued. Two of these, Saglek and Cartwright radar sites, were exempted from the provincial environmental assessment process with the understanding that the federal Environmental Assessment Review Process (EARP) be applied. Through EARP several assessment studies were undertaken by the Department of National Defence and Environmental Protection Plans were developed for each site. One exemption was issued for the various onshore facilities proposed around Placentia Bay for Hibernia development. The objective of this exemption was to enable government to address various environmental impacts (including cumulative) for unidentified proponents through a special committee, the Hibernia Construction Sites Environmental Management Committee. This is an interdepartmental committee chaired by the Assistant Deputy Minister of Environment.* As part of the committee's mandate it will meet with the public in the areas to be impacted. The final exemption involves government making an early decision to approve the development of the Hope Brook Gold Mine and to facilitate the initiation of some site preparation activities while studies were ongoing in support of the Environmental Impact Statement to determine how the mine and processing facilities were to be developed.

Five Environmental Impact Statements and one Environmental Preview Report were completed:

> **Freshwater Offshore Base** — This EIS considered the development of a world-class offshore support base for Freshwater Bay, occupying 283 acres with road access connecting to the Cape Spear Highway. The impacts identified and the mitigation proposed are listed as follows:

* Its main role is to oversee the preparation of Environmental Protection Plan(s) for the Hibernia related on-shore construction sites.

- loss of access to woodcutting with mitigation of making provision for traditional users to remove the timber required for site development;
- loss of 50 stevedore jobs in St. John's which will be replaced at the new site
- loss of cod trap fishery; partial loss of squid and lobster fisheries; with mitigation to include compensation to be negotiated with fishermen impacted and procedures and equipment to reduce the safety hazard
- a net short- and long-term employment gain.
- some traffic load increases on the Cape Spear Road with wear and tear and associated increased hazard for the public (especially children) in Shea Heights with mitigation to include scheduling work to reduce said impacts; institution of policed cross-walks during high traffic periods.
- biological impacts to include short-term siltation of Freshwater Bay, some loss of marine habitat associated with dredging the approach, the loss of Freshwater Bay Pond as a freshwater environment, increased potential for accidental hydrocarbon and drilling chemical spills, some loss of the natural character of the landscape on-site and in adjoining environs, displacement of wild animals and birds presently inhabiting the site.
- there will be disruption of some archaeological remains of a small extinct community.
- with the exception of its aesthetic and recreational value, the site possesses no special attributes or features.

Grandy Brook Station to Hope Brook Station Transmission Line: This proposal involved supplying the Hope Brook Gold Mine via a conventional 138 kilovolt transmission line running 33 km from Grandy Brook Station to the Hope Brook Gold Mine. Historic resources and raptor studies were conducted along the proposed route. As well a comprehensive environmental protection plan was developed to commit to the implementation of protection measures ranging from route selection to rehabilitation of construction-related impacts. Measures were included to minimize any impact on the La Poile caribou herd during construction and operation of the line. As well, an environmental effects monitoring study was committed to test the predictions made concerning the caribou.

Ross Bay Junction - Churchill Falls Tote Road: The EIS of this proposed road looked at two alternative routings along a five-km wide corridor centered on the alignment. Seven component studies were undertaken in support of the EIS. The southerly route chosen costs $2.8 million less for construction, would be less costly to users, has less potential impacts on salmonids, wildlife, and native resource use but slightly greater impacts on utilization of borrowed material and slightly more impact on historic resources. The major mitigation included protective measures for rivers and streams, locating quarries away from the road and having government prepare a comprehensive resource management and land use plan within the study area to control potential associated development (e.g. cabins) which was predicted to have a greater impact than the road itself. Declaring this as a "protected road" under provincial statutes was also proposed.

Environmental Assessment officials conducting a surveillance inspection of construction activities along the transmission line from Burgeo to Hope Brook.

Hope Brook Gold Mine: This EIS considered the development of the Province's first gold mine, five km inland from Couteau Bay on the island's south coast, with a proposed extraction of 38.3 million grams of gold over an eleven year period. Development would proceed by two methods — open pit mining and heap leach gold extraction process followed by underground mining and conventional gold milling. Access will be by sea and a five km road from the docksite to the mine. Crews will work on a 14-day shift living in onsite quarters designed for 152 persons. Total direct employment is estimated to be 260.

Three watersheds will be potentially impacted, the Cinq Cerf Brook, Boat Hole Brook and Betty's Pond. Toxic effluents will be limited to the latter small watershed. Enforcement of stringent provincial and federal effluent standards will minimize impacts on aquatic resources such as salmonids and the nearby marine fishery.

The nearby La Poile caribou herd makes seasonal use of the area. Mitigation measures include moderating construction and operating activities when the caribou move close to the mine site, particularly during the calving and post-calving periods. Monitoring studies will be conducted in cooperation with the Wildlife Division and jointly funded over the first four years of the development. As well, monitoring of eagle and osprey populations will be undertaken.

Two Recent Indian (Little Passage Complex) sites were discovered in the Couteau Bay area nearby the docking facilities. These areas will be protected during development and operation of the mine.

The development is not expected to significantly alter traditional resource utilization in the area.

Connection of the mine site to the Provincial grid will enable a short distribution line to be built to connect Grand Bruit to the provincial grid, reducing this community's electrical costs.

Upper Humber/Main River Forest Harvesting: This EIS considered the impacts of a proposed forest harvesting undertaking on the forenamed area (ca. 2000 square km, and in particular on the Main River which had been alternatively proposed for a Wilderness Reserve under the Wilderness and Ecological Reserves Act. The development would see the harvest of 4.2 million cubic meters of wood over 20-30 years, comprising 35% of the land area with a maximum of 2% harvested in any one year. Various physical and biological resources were studied and, in consultation with the Wilderness and Ecological Reserves Advisory Council (WERAC), a comparison of reserve areas proposed by Corner Brook Pulp and Paper Ltd. (5234 ha proposed by the proponent) and WERAC were presented. As well mitigation for other sensitive areas for moving the location of a proposed bridge and for harvesting in general were committed to. A government decision on the final reserve area is pending.

Labrador West Dolomite Quarry: An Environmental Preview Report was prepared by the Iron Ore Company of Canada to address concerns for increased truck traffic through the townsite of Labrador City.

Other environmental assessments ongoing include:

Little Grand Lake Logging;
St. John's Outer Ring Road and Transmission Line;
Herbicide Application Program 1985-89;
Cow Head Archaic Park;
Robin Hood Bay Energy-from-waste;
Paradise River Hydro Plant;
Grand Bruit Grid Interconnection;
West Salmon Dam Gated Spillway;
Penetanguishene Trunk Sewer;
Portugal Cove Road Quarry and Asphalt Plant Relocation and Paddy's Pond Airport.

Withdrawn from the environmental assessment process by the respective proponent was Remote Cottage Areas — Western Region.

3.0 ENVIRONMENTAL IMPACT MANAGEMENT BRANCH

During 1986 surveillance activities were initiated at the sites of foregoing undertakings for which Environmental Impact Statements were accepted as well as for Governor's Park. Surveillance activities continued for the Cat Arm Hydroelectric Project where the proponent completed cleanup activities and the majority of revegetation and at the Upper Salmon hydroelectric project site where ongoing discussions are occurring relative to vegetative rehabilitation to stabilize certain remaining sites. As well an assessment was initiated to determine the enhancement potential for the Cat Arm reservoir. Work is also continuing on the development of a comprehensive resource access road policy proposal for government.

4.0 PESTICIDES CONTROL BRANCH

The Pesticides Control Branch is responsible for ensuring that pesticides are used in a safe manner by certified applicators. Pesticide applicators must work under licence to a licensed pesticide operator, who has submitted a pest control program to the Pesticide Advisory Board for review. This Advisory Board makes recommendations to the Minister of Environment on the acceptability of the proposed program and on such safeguards as buffer zones for sensitive areas.

During the fiscal year there were 27 operator licenses issued, along with 75 applicator licenses. Seventeen inspections were carried out and a number of inquiries and complaints were responded to.

The successful implementation of pesticide applicator certification has resulted in improved safety measures being undertaken by applicators.

Licensed operations included biting-fly control, rights-of-way vegetation management, hemlock looper control, silvicultural experiments and structural pest control.

Environmental Investigations Division

C. Strong — Director

1.0 INTRODUCTION

The Environmental Investigation Division is responsible for the enforcement of the Waste Material (Disposal) Act. This involves monitoring of commercial, municipal, and hazardous wastes and ensuring that they are disposed of in an environmentally acceptable manner. The Division is also responsible for processing applications for fuel storage systems and providing inspections for these systems. Other activities include the spill response program, livestock developments, and small scale development referrals and assessments.

The Division has staff in four Regional Offices — Labrador (Goose Bay), Western (Corner Brook), Central (Grand Falls), and Eastern (St. John's). The Headquarters Office is located at the Confederation Building, St. John's. A modest staffing expansion was approved and plans were implemented this year, in preparation for the opening of a fifth Regional Office in Clarenville to serve the Burin and Bonavista Peninsulas.

The Division has a total of twenty permanent staff members:

1 Director
1 Licensing and Enforcement Supervisor
4 Regional Supervisors
8 Environment Specialists
2 Enforcement Officers
4 Stenographical Support Staff

1986-87 proved to be a very busy year for this Division with duties involving the processing of referrals and detailed applications for developments such as waste disposal sites, farms, septic tank systems, and hydrocarbon storage systems; responding to approximately 240 environmental emergencies such as oil leaks and other hazardous materials spills; and dealing with approximately 9,200 complaints and inquiries.

Particularly prominent inquiries during 1986 involved requests for information on chemical waste disposal. Increasing numbers of complaints centered around the operation of livestock farms, sawmills, and fish plants.

In the area of satisfactory alternatives for waste disposal, progress was made with the operators of problem sawmills and fishplants. A review of livestock guidelines was undertaken in conjunction with the Agriculture Division of the Department of Rural Agricultural and Northern Development with a view to creating an acceptable system to separate new livestock units from residential areas and to stop residential encroachment on established livestock farms.

During the year 40 commercial and municipal waste management systems were issued Certificates of Approval, bringing the percentage of such systems under valid license to over 92%. 165 Approvals were issued for hydrocarbon storage tank systems and 28 small sewage disposal systems were licensed.

2.0 HAZARDOUS WASTE

The **Environmental Investigations Division** continued to work closely with Environment Canada and industry in Newfoundland throughout the year with respect to the phase-out of electrical equipment containing polychlorinated biphenyls. Fourteen of the twenty-two approved PCB storage locations have been officially licensed.

An extensive oilspill cleanup operation involving much equipment and many man weeks needs to be supervised by Environmental Investigations Division staff after accidents such as this tank truck overturned on the Trans Canada Highway on the Avalon Peninsula istmus. In all such cases the owner of the product is responsible for recovering the pollutant and restoring the equipment.

1986 saw the continuing assessment by the Division of various available technologies that could well serve as economically viable options for the disposal of PCBs in this province. At the invitation of the Department of National Defence, the Division is represented on a Steering Committee which will give a detailed look at expediting environmentally acceptable destruction of a relatively large quantity of mostly PCB contaminated solids (such as soils from spill cleanups) centered in secure storage facilities at Goose Bay.

3.0 SOLID WASTE MANAGEMENT

A record 90% of Newfoundland municipalities and other local jurisdictions held valid waste management system Certificates of Approval in 1986-87.

One of the goals of the Division is the reduction in the number of waste disposal sites required in the Province. A highlight in this area for 1986 was the centralization of waste disposal for all communities on Fogo Island.

Efforts were continued to license all commercial waste management systems. Emphasis was placed on construction and hunting camps, with organizational and field work completed by year-end.

4.0 LABRADOR MAJOR PROJECTS

The Department undertook the final clean-up of abandoned radar sites in Labrador.* Demolition and restoration work is expected to be completed in 1987.

An agreement was reached with Woodward's Oil Ltd. on the degree of improvement necessary at their bulk fuel storage locations along coastal Labrador, as well as suitable timing for those improvements.

5.0 PROSECUTIONS

This year saw increased enforcement efforts by the *Environmental Investigations Division*, against both individuals and companies responsible for serious environmental

* Financial assistance for this project was received from the Department of National Defence in the amount of $5,000,000.

abuses and neglect of legislation. Legal action was taken against businesses located in St. Joseph's, Burgeo, William's Harbour, Trepassey, Mt. Pearl, Aquaforte, Green's Harbour, McCallum, Badger, Perry's Cove, and Lark Harbour. Assistance was also provided to Waste Disposal Committees to enable the collection (under *The Small Claims Act*) of outstanding garbage disposal fees.

Efforts were also successful this year in reaching an understanding with our Federal counterparts on the importance of sharing responsibility in the area of enforcement. In this regard the Environment Canada Office in Newfoundland laid charges for two serious pollution incidents.

6.0 STAFF TRAINING

Several Regional Supervisors and Environment Officers received training during the year, in various technological developments associated with pollution prevention and abatement. An Enforcement Officer attended a course on "How to Give Environmental Evidence" at the Banff School of Management. Another Enforcement Officer will be attending this course in 1987.

7.0 PUBLIC AWARENESS

Particularly successful in 1986 was the Public Information and Awareness program *"Down the Drain and then Where?"* pertaining to the discharge of hazardous materials.

Co-operative efforts with other agencies during 1986 led to television public service announcements publicizing the 24-hour environmental emergency telephone number, 772-2083.

8.0 STATISTICS

The following statistics are shown to indicate the growth in responsibilities and output of the *Environmental Investigations Division* over the past ten years:

	1976-77	1986-87
Referrals	895	867
Certificates of Approval (Small Developments)	142	233
Spills Reported *	116	242
Actions by the Department under:		
— Waste Material (Disposal) Act Section 19(1).	19	85
—Dept. of Environment Act and Regulations.	0	40
Complaints and Inquiries	2,900	9,200

* Promulgation of The Storage and Handling of Gasoline and Associated Products Regulations in 1982 makes it an offence not to immediately report a spill of more than 70 litres to the following 24-hour service: 772-2083 or Zenith 07021.

Industrial Environmental Engineering Division

Les Hulett — Director

1.0 INTRODUCTION

The Industrial Environmental Engineering Division is responsible for ensuring that all industry in the province complies with the requirements of established environmental standards, as outlined in legislation. New industries are reviewed for their ability to meet these standards and, where existing industry is not meeting such standards, negotiations take place to ensure that compliance is achieved. The Division is also responsible for monitoring and assessing the impacts of acid rain in Newfoundland and initiating suitable abatement programs to limit acid rain impacts.

Permanent divisional staff include two engineers in St. John's, one regional engineer based in Corner Brook, and one environmental technician. Temporary staff include one acid rain technician, one engineer and one engineering technician.

1986 was an eventful year for the Division. There have been major developments in the mining sector culminating in the decision to proceed to the production phase of the gold deposit at Hope Brook. During the year there have also been compliance negotiations with Corner Brook Pulp and Paper and ERCO. It is anticipated that these negotiations will lead to better environmental controls at these plants. The other highlight of 1986 was the participation in the negotiations with Newfoundland Energy Limited for the sale of the Come By Chance refinery and the subsequent rehabilitation of the refinery.

Staff from department inspecting waste from refinery.

2.0 MINING

The Hope Brook Gold Inc. mine at Hope Brook on the Cinq Cerf watershed, will, when full production is reached in 1988, be one of the larger gold mines in Canada and the first major operation to use the heap leach extraction process in Canada. The Industrial Environmental Engineering Division has worked closely with the company and its consultants to ensure that the mining and milling operations are designed in an environmentally acceptable manner, capable of achieving the required standards for effluent discharges. Effluent treatment, especially for cyanide and heavy metals, will conform to the latest advances in technology and will be based on the experience gained during the heap leach trial of 1985.

The St. Lawrence Fluorspar mining operations were started in mid 1986 and the mill commenced operation in early 1987. Attention was given to the design of an adequate tailings settling area and the control of mill effluent. At the same time attention was given to mine drainage water and suitably sized settling ponds were installed. This project is proceeding in an environmentally acceptable manner.

The Iron Ore Company of Canada came forward during the year with proposals to modify their tailings handling system. This proposal, together with an adequate revegetation program should go a long way towards alleviating tailing dust lift off. This proposal is presently being studied by the Department. (The significant environmental event at IOCC was the installation of two large wet mills.) These will replace a number of smaller dry mills and will help considerably towards reducing dust emissions from the plant.

The Department also had considerable input into the final transfer of assets from the **ASARCO** mine at Buchans to the Buchans Development Corporation. As a result, funds became available to vegetate a large area of the tailings dam which had been responsible for previous dust episodes in the town. Further work is needed here in 1987 and the Department will continue to give support.

3.0 PULP AND PAPER

During 1986 negotiations were commenced with **Corner Brook Pulp and Paper** to ensure compliance with environmental requirements under the current modernization program. Compliance is being required for water effluent, air pollution and solid waste management. A number of improvements are planned for the next four years, at a cost of several million dollars. This should lead to considerable improvements in water and air quality.

Improvements were also started at the **Abitibi-Price** mill in Grand Falls, where automated boiler controls and heat recovery from the thermo-mechanical pulping units should help to reduce emissions of sulphur dioxide and particulate matter to the atmosphere.

4.0 Other Industry

In 1986 **North Star Cement** in Corner Brook completed a $4 million modernization of their cement plant which has led to considerable improvements in dust emissions from this plant. In particular, the baghouse dust collectors on the cooler stacks and a preconditioning tower for the electrostatic precipitators have helped to reduce considerably the dust emissions from this plant.

Ongoing discussions with **ERCO** have focussed on a number of areas including better controls of fluoride emissions, better control of phosphorus mud waste and control of tapping fumes. A compliance schedule is currently under review and ERCO should make significant progress in all these areas in the next few years.

The most exciting prospect for this province is the reactivation of the **Come By Chance** refinery. This will pose a number of interesting environmental challenges and the Department started to prepare for these in 1986. A review of air emissions was conducted for the new owners. It is anticipated that the operating configuration being proposed will present no major problems and sulphur dioxide levels will be within the legislated limits.

Much attention was given to handling the solid wastes left by the previous operators and ensuring that these wastes will be properly handled and disposed of. The new operators will also be expected to establish a comprehensive waste management strategy. A study of the existing waste sites and the requirements for a new waste site are underway. Much of 1987 will be spent on waste management at the refinery with attention being given to long term solutions to these problems. Other areas of focus will be water effluent quality and air quality.

5.0 ACID RAIN

The province continues to show concern for the potential impacts of acid rain in Newfoundland. Fortunately the amount of acid rain being measured has not yet reached critical levels and has actually decreased slightly in the past two years. It is speculated that this might be due to the widespread reductions in sulphur dioxide emissions across eastern Canada and the New England states. These regions have seen an overall reduction of sulphur dioxide emissions of nearly 20% since 1980.

In Newfoundland the 1980 sulphur dioxide annual emission level was 58,000 tonnes. This was reduced to 49,000 tonnes by 1985 and the 1986 level is estimated to be 43,000 tonnes. In 1985 Newfoundland, together with the other eastern Canadian provinces and the Federal government, committed to a series of sulphur dioxide emission reductions which would total almost 2 million tonnes by 1994. Newfoundland committed to reduce from 58,000 tonnes to 45,000 tonnes by 1994 and it is now estimated that this might be achieved and sustained before 1990.

In March, 1987 the Newfoundland Minister of Environment signed a bilateral agreement with his Federal counterpart formally committing Newfoundland to reach its 45,000 tonnes target. To this end a number of industries have taken progressive actions to reduce their dependance of high sulphur fuel oil. Further actions of this type are anticipated in the next few years.

Water Resources Division

Wasi Ullah — Director

1.0 INTRODUCTION

The Water Resources Management Division is responsible for policy development and the implementation and evaluation of approved programs relating to the conservation, development, control, improvement and proper utilization of water resources of the Province, including the allocation of the use of all surface, ground and shore waters as outlined in the Department of Environment Act. In addition to regulatory responsibilities relating to water resources management, the activities and programs of the Division include collection of hydrologic data from various network stations, hydrologic and hydrogeological studies, environmental impact studies, protection of water supply areas, flood risk mapping, data processing and application of hydrologic models, flood forecasting, etc.

The program plans for the Division are developed and implemented by four Branches which are headed by senior professionals having expertise in specific areas. The approved positions in the Division consisted of eight professional, nine technical and one secretarial staff. The field programs are assisted by part-time observers. The approved funding for the year under report was $1,328,300.

The report that follows outlines the progress of various activities and programs under each Branch of the Division.

2.0 SURFACE WATER

2.1 Water Resource Inventory — Hydrologic Networks

2.1.1 *Hydrometric Network*

During the year, five new stations were constructed and more than 80 stations were operated by the Water Survey of Canada at a total cost of over $500,000 under the Canada-Newfoundland Hydrometric Surveys Agreement (signed in April 1975). About 20 of these stations are equipped with Data Collection Platforms (DCP) for obtaining real-time data via a satellite. Some of the data retrieved from these DCPs are used for flood forecasting. In addition, the Province operated five hydrometric stations on small watersheds not adequately covered under the Agreement.

2.1.2 *Climatological Network*

The Province and the federal government signed an agreement during the later part of 1986-87 to: i) expand the network; ii) conduct climate related studies; and iii) transfer technology related to data processing and application. The Agreement provides for the addition of more than 70 stations in the next five years.

2.1.3 *Water Quality Network*

The Province has recently signed an agreement with the federal government to jointly establish and operate a network of water quality monitoring stations. The current year program provides for monitoring of 85 stations at a total cost

Staff member conducting Geophysical Survey of subsurface contaminant plume, at a landfill site.

of $374,272 to be shared on an approximately 60/40 basis between the provincial and federal governments respectively. The program is implemented by three Water Quality Officers in the regional offices located in St. John's, Grand Falls and Corner Brook, and a Water Quality Manager in St. John's.

The Agreement currently generates monthly data from 49 stations and annual data from an additional 36 stations. Each sample is analyzed for at least 34 water quality parameters.

2.2 Protection of Water Supply Areas

Under Section 25 of *The Department of Environment Act,* 10 new water supply areas were protected during 1986-87 bringing the number of protected water supply areas to 147. In such areas, activities having potential to impair water quality are strictly controlled. The draft regulations under the Act are being finalized in consultation with other resource departments and agencies.

2.3 Hydrologic Impact Studies

2.3.1 *Waterford River Basin Urban Hydrology Study*

The five year federal-provincial cost/work shared study officially ended in September 1986. Out of the 14 reports, six reports have been published. The remaining are in varying stages of completion. The study yielded interesting and useful results.

2.3.2 *Peat Development Studies*

Studies are under way in St. Shotts and Bishop Falls to assess the effects of peat development on surface and groundwaters. Hydrometric and precipitation stations are maintained at both sites, and water samples are collected regularly. Groundwater levels are also monitored regularly, and peat samples have been collected for analysis of moisture content. These data will permit analysis of the effects of peat harvesting operators on both surface and groundwater quality and quantity.

2.3.3 *Other Resource Development Activities*

A number of preliminary studies are in progress to assess the impacts of various resource based activities such as urbanization, logging, cottage development, and quarries on water quality and quantity. The results obtained from these studies will help in the development of guidelines for the protection of water resources and the environment.

2.4 Water Resources Study

The Water Resources Study of the eastern Avalon Peninsula was completed during the period under report. The report analyzed the water supply demand situations for various beneficial uses in the study area and made specific recommendations to meet future requirements and to minimize conflicts.

3.0 GROUNDWATER BRANCH

3.1 General

The Groundwater Branch consists of a senior hydrogeologist as Groundwater Resources Manager, a geophysicist as Water Well Inspector and a Water Resources Technician. The mandate of the Groundwater Branch includes the planning, management and regulation of groundwater resources in the Province.

In addition to the water related mandate of the *Department of Environment Act*, the Branch is also responsible for the administration of the *Well Drilling Act*. The programs that are outlined below are designed to fulfill this responsibility.

3.2 Inquiries

The Branch handled 54 inquiries during the year to obtain information on:

— reports published by the Branch	16
— well construction, techniques, drilled well and dug wells, pumping test, etc.	21
— groundwater related programs/studies and water quality	11
— drilling companies	5
— subdivision development	1

3.3 Groundwater Investigations

The Branch responded to all requests that it received from both public and private individuals, groups and agencies on matters relating to groundwater. When the situation warranted, a full field investigation was conducted. In the year under review such investigations included five for groundwater pollution, two for salt contamination, two for insufficient supply and one for improper well construction. Technical reports were prepared for each investigation.

3.4 Groundwater Studies

In order to determine realistic guidelines for the protection of groundwater in the vicinity of development projects, the Branch continued to work on four long term studies.

At the Terra Nova Regional Waste Disposal Site, 14 wells and two surface drainage sites were sampled for water quality analyses. Such work has been carried out at this site for 10 years and preparations for a third interim technical report got underway during the year.

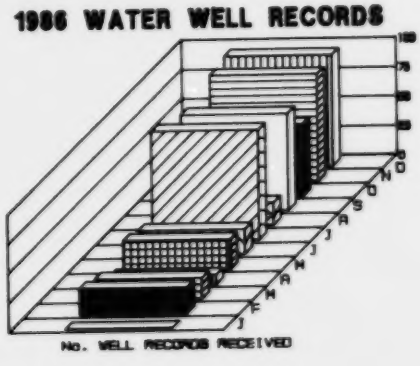
At the Bishop Falls and St. Shotts peat land development sites a total of four groundwater wells and seven surface water sites were sampled weekly, during the field season, for a number of parameters to determine the effects of peat land development on water quality.

As a component of the Waterford River Basin Urban Hydrology Study., the Groundwater Branch installed 14 monitoring wells in 1981 to determine the effect of urbanization on groundwater resources. Water samples were obtained quarterly and the water levels were measured monthly. In the year under review, in addition to the normal monitoring schedule, the final technical report for the installation and testing of the monitoring network and the first draft of the final groundwater component of the study were prepared.

The fourth study is presently ongoing in the North Pond Brook watershed in Torbay. This water balance study is designed to determine the seasonal fluctuations of the water table and to estimate the volume of recharge into the groundwater regime annually. The water level in a dug well was monitored continuously and in three other similar wells on a weekly basis. In addition, the water quality at two surface water sites was monitored monthly. A gauging station monitored the streamflow.

3.5 Water Well Information/Inspection

In 1986 five companies were licenced to drill water wells in the Province and approximately 650 water well records were submitted by the drillers. The records were checked and stored in the computer based well information system. The estimated annual expenditures by consumers in this industry is about two million dollars including the subsequent hookup of each completed well.



Water well inspections were completed on 215 wells during the year since the hiring of a water well inspector in October, 1986. The Branch sponsored a Well Drilling Workshop to make the drilling industry more aware of the requirements of the Act and thus to ensure the safe location and construction of water wells. All of the licensed drillers in the Province attended this workshop.

3.6 Hydrogeological Mapping

The last study report in a series of eight regional hydrogeologcial studies was prepared during the year under review. The report provides an up-to-date interpretation of all available groundwater information for the study area.

3.7 Groundwater Protection Zones

The Well Drilling Act provides for prescribing groundwater protection zones by the Minister in areas where the groundwater aquifer is vulnerable to contamination or over pumping. A study was completed, during the year, to determine the appropriate groundwater protection zones for the Town of Stephenville Crossing. The report recommended restrictions on resource development activities in these zones. The Town will be requested to incorporate these recommendations in the new municipal plan that is presently being finalized.

3.8 Observation Well Network

Two more observation wells were installed during the year bringing the total to five. The new wells were installed in the central region of the Province and, like the others already in operation, will monitor the water level continuously as well as provide quarterly water quality data. The purpose of the observation well network is to provide information on regional groundwater level fluctuations for the determination of total usable groundwater resources and the quality of groundwater in a basin.

4.0 HYDROLOGIC MODELLING BRANCH

4.1 General

The Branch is responsible for the development, application and evaluation of techniques and methodologies, including hydrologic and hydraulic models, presently used for management of water resources, resolution of water related problems, and resource planning. The responsibility covers areas such as water systems analysis, hydrologic data analysis, computer modelling and special projects and studies.

The Branch consists of a Water Resources Engineer and a professional engineer who are assisted by staff of other Branches as and when required.

4.2 Hydrologic Data Analysis

Physiographic characteristics of 15 watersheds ranging in size from 5.5 km^2 - 134 km^2 were abstracted and stored in the data base.

A pilot project was initiated to obtain land use information using satellite photographs. Results are being evaluated.

Hydrologic data collected from various study areas were processed using the Divisions computer facilities. A very efficient computer program for processing of tipping bucket rain gauge charts was developed and tested.

4.3 Computer Modelling

Several computer models were adapted and stored in the Newfoundland and Labrador Computer Services facilities for use by government departments and other agencies. Some of these models were applied in problem areas such as the Exploits River in Badger for flood forecasting purposes.

An automatic computer based system has been developed to retrieve streamflow data from more than 20 stations equipped with Data Collection Platforms, on a real-time basis from Washington, Ottawa and Halifax. The real-time data has been used for the purpose of flood forecasting/warning in flood prone areas such as Badger and Steady Brook.

The data processing facilities were substantially expanded during the year to meet the increasing need of the Division.

4.4 Special Projects/Studies

A User's Guide summarizing the results of an earlier report "Regional Flood Frequency Analysis for the Island of Newfoundland" was prepared for general distribution to all those involved in the design of hydrologic structures such as bridges, culverts, spillways, diversion channels, etc.

The existing methods for base flow separation were reviewed and a report containing recommendations for their applicability in Newfoundland was prepared.

5.0 WATER INVESTIGATIONS BRANCH

5.1 General

The Water Investigations Branch adminsters Section 26 of The Department of Environment Act which requires approval of the Minister for all stream alteration works. The approval process involves review of design specifications, hydrologic, hydraulic and environmental impact analyses, preparation of terms of reference for approvals, inspection and evaluation, and the development of policies and programs, guidelines and standards, and legislation relating to water body alterations.

The Branch is also involved in the investigation and engineering analysis of water related problems such as water quality degradation, flooding, erosion and sedimentation, drainage etc. The Branch is responsible for the implementation of the Canada-Newfoundland Flood Damage Reduction Program.

The Branch consists of a Water Resources Engineer, a Project Engineer and a Water Resources Technician.

5.2 Environmental Approvals

205 approvals were issued for various works involving alteration to bodies of water (both surface and shore waters) during 1986-87. This number has been increasing every year as shown in Figure 1. The project types approved in 1986-87 are shown in Figure 2.

Water Resources Division

Fig. 1 Approvals Issued per Year

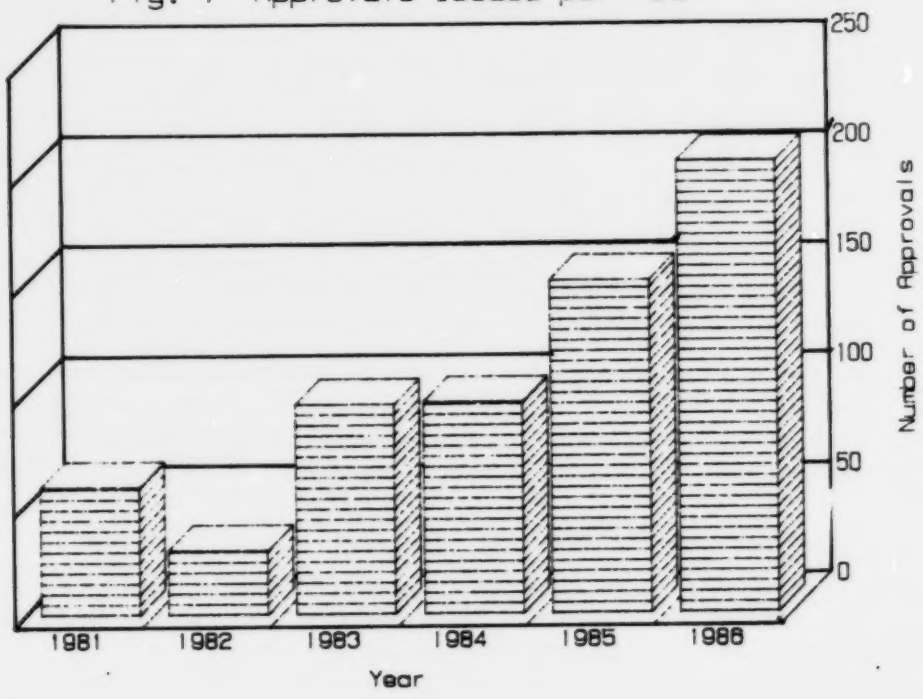
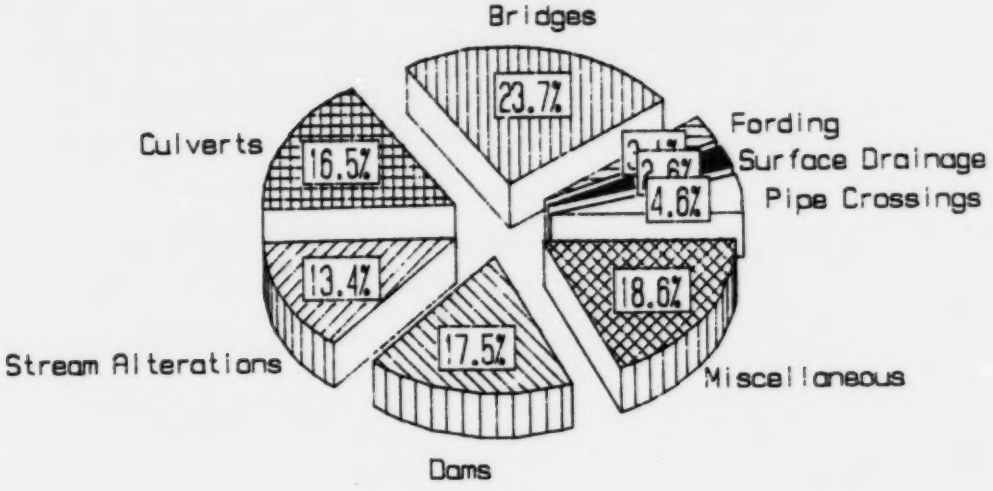


Fig. 2 Projects Approved for 1986/87



5.3 **Investigations**

The Branch conducted about 54 investigations and made recommendations to resolve various water related problems experienced by individuals and communities.

The breakdown of the problem is as follows:

— Flooding	24
— Storm drainage	7
— Erosion/sedimentation	15
— Infilling/Water quality	7
— Others	1

In addition, more than 400 enquiries and complaints from various individuals, communities, and agencies were addressed.

A major channel improvement work was carried out in Harry's River in Black Duck to alleviate the problem of ice jam related flooding experienced in the past. Also, the flood control measures, recommended by the consultants in their report "Hydrotechnical Study of the Rushoon Area" were implemented.

5.4 **Technical Studies/Services**

Draft guidelines on stream crossings have been prepared which will be ready for distribution early next year. A computer program for estimating peak flows using the results of the regional flood frequency analysis has been released. A brochure on the approval process was prepared and widely distributed for public information and compliance.

5.5 **Flooding Studies**

5.5.1 ***Canada-Newfoundland Flood Damage Reduction Program***

The following areas were studied and/or mapped during the period under report. The reports are in various stages of completion:

— Steady Brook — remedial measures
— Placentia — infilling impact
— Waterford River — hydrotechnical study
— Stephenville Crossing and Black Duck Area — hydrotechnical study
— Deer Lake — hydrotechnical study

5.5.2 ***Other Studies***

Ice and flow monitoring continued as per the plan in the following areas:

— Terra Nova River near Glovertown
— Exploits River near Badger
— Harry's River near Black Duck